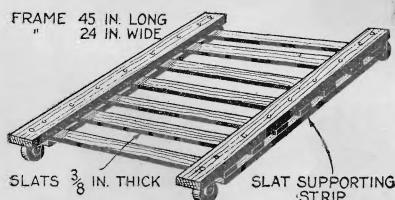


Valuable Kinks for Your Car

Protector Keeps Starter Switch Clean—Accurate Way To Fill Batteries—Other Ingenious and Useful Ideas

Underslung Auto Creeper

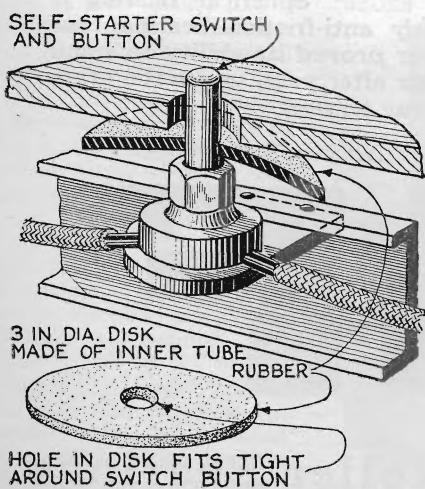
MANY motor car owners hesitate to tackle any job that requires crawling under the car, because, even with overalls, clothes are ruined by the oily slime on the floor. The remedy for this situation is to build yourself a comfortable auto creeper so that you can slide under any part of the car without damaging your clothes, and in a most convenient manner. Modern cars are built so close to the ground that space under them is at a premium. Every inch



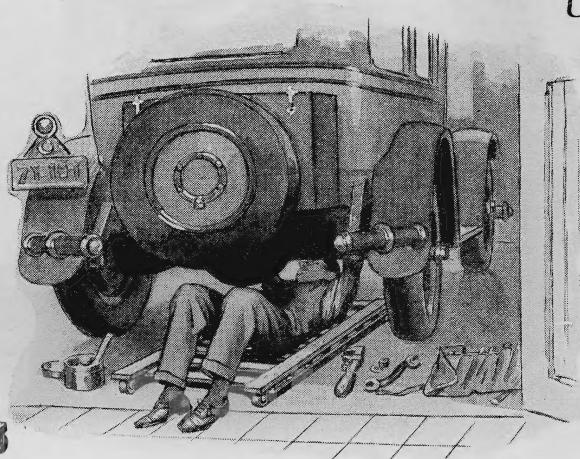
counts. The creeper shown in the drawing and illustrated in use is comfortable and affords you maximum working space.

Starter Switch Protector

THE mud brought into your car often works down through the hole around the starter switch plunger and pieces of grit jam it so that it will not work. A simple way to overcome this trouble is to cut a disk of sheet rubber out of an old inner tube and in the center of the disk cut a hole somewhat smaller than the starter switch plunger. Stretch the hole over the plunger as shown in the illustration. Dirt that drops through the hole in the floor board will slide off the rubber shield to the ground without getting into the switch.



In muddy country a rubber disk around the starter switch plunger will keep out the dirt



This underslung creeper, which is easily made at home, makes work under the car a pleasure and gives you as much space as possible to move about

Ten Dollars for an Idea!

WILLIAM P. MARTIN, of Jersey City, N. J., wins the \$10 prize this month for his suggestion of a battery filler. POPULAR SCIENCE MONTHLY awards \$10 each month, in addition to regular space rates, to the reader sending in the best idea for motorists. Other contributions that are published on this page are paid for at the usual rates.

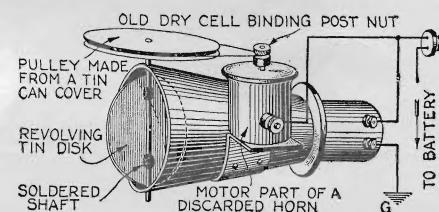
Mysterious Ignition Woes

HIGH tension current, such as is employed to produce sparks at the spark plug points in an automobile engine, jumps across the points only when it can find no easier path to travel. Occasionally a cylinder will misfire in a mysterious way, due to an accidental path being provided for the passage of the high tension current. In a heavy rainstorm the motor may start to misfire because a rain drop is now and then flung by the fan onto the side of the spark plug. The moisture bridges over the insulation and the cylinder will misfire until the heat of the plug evaporates the water. If the plugs are covered with a layer of dust and grime, trouble is often experienced in starting a motor that has been left out in the rain for some time, because moisture has condensed on the dust and made it a good path for high tension current. The remedy for that trouble is to keep the exposed part of the insulation wiped clean at all times.

Another source of trouble is old ignition cable. The rubber dries out and cracks and the spark jumps through the crack to the nearest metal. The cable may look all right, but if you lift the hood in the dark you will spot the leak.

Unique Note for Your Horn

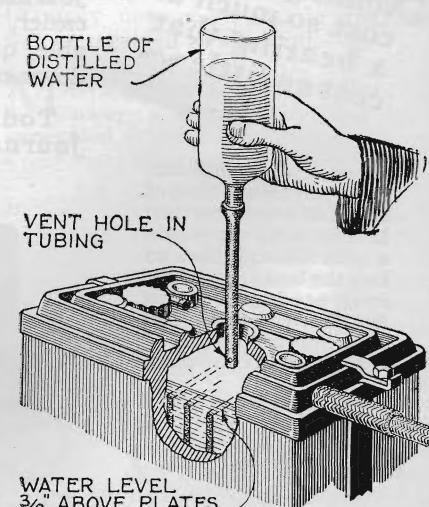
IF YOU are tired of the steady tone of your horn, here is a way to get a warbling effect that will arrest the attention of every pedestrian. The illustration below shows the arrangement. It can be applied to any type of horn, either motor driven or buzzer type. First fit the shaft through the mouth of the horn and to this attach a metal disk just small enough so that it can be revolved. Now fit a large pulley on top of the shaft. This can be made of a circular disk of cigar box wood with a groove whitled in the edge. Attach a small motor to the side of the horn.



A most peculiar warbling note can be obtained by the use of a disk rotated by a small motor. Your horn will command attention on the road

Automatic Battery Filler

TAKE a bottle of small size and a piece of rubber tube large enough to stretch over the end as shown. Cut a small hole in the side of the tube a distance from the end equal to the height of the battery solution at the maximum point. Squeeze the tube with your fingers, insert it in the battery till it touches the plates, and let go the tube. Water will flow into the battery until the hole is covered.



You can fill each cell of your battery with this simple device without spilling any of the water

Helpful Hints for Your Car

Windshield Sleet Wiper—Ending Cold Drafts—Other Useful Kinks

EVERY motorist quite frequently encounters the peculiar combination of atmospheric humidity and sudden temperature change that results in heavy fog forming on the inside of the windshield. The ordinary wiper, either mechanical or hand operated, wipes only the outside of the windshield and the driver continually has to wipe the fog from the inside of the glass in order to obtain clear vision.

Then there usually is trouble in winter with sleet freezing on the glass, in spite of the operation of the wiper. Fig. 1 shows how to eliminate both fog on the inside of the glass and freezing sleet on the outside. Remove the regular rubber wiper and substitute a tubular piece with a strip of felt let into a slot in its side as shown. A mixture of alcohol and glycerin

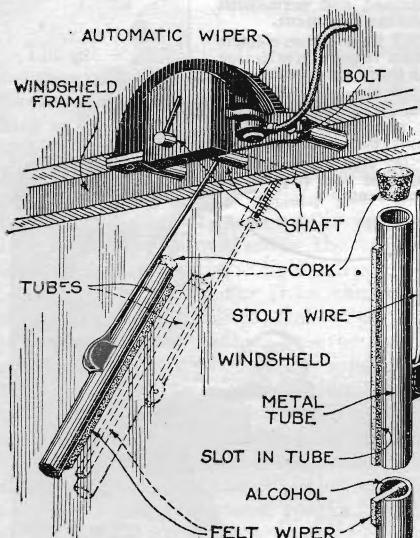


Fig. 1. Adjustment of a felt wiper to take sleet from outside or fog from inside of windshield

poured into the tube will allow the wiper to keep the glass clear in a sleet storm. A duplicate tube fitted to a special arm will take care of the inside of the glass in the most severe weather.

Ten Dollars for an Idea!

WALTER S. ESTBY, of Buhl, Minn., wins the \$10 prize this month with his suggestion of a windshield wiper improvement (Fig. 1). Each month POPULAR SCIENCE MONTHLY awards \$10, in addition to regular space rates, to the reader sending in the best suggestion for motorists. Other contributions published are paid for at the usual rates.

A Good Remedy For Cold Feet

WHILE it would be possible to fit the floor boards of an automobile so carefully that there would be no space around the pedals for air to blow through, most cars aren't made that well, and consequently there always is a blast of cold air coming up around the brake and clutch pedals in winter.

The result is cold feet and discomfort. The remedy is to fit a supporting plate covered with a piece of sponge rubber on each pedal at a point where it will press lightly against the underneath side of the floor board when the pedal is in the up position. The idea is equally useful in summer to keep the heated air under the hood from burning your feet.

Putting a felt pad under the floor mat in both the front and rear compartments also helps to keep the car warm and also makes the car more silent, absorbing the rumbling and rattling noises.

For Use on Steep Hills

WHEN you park your car on a very steep hill there is always the chance that some mischievous child will throw off the emergency brake and allow the car to coast down the grade into a serious accident. There are times, too, when you have to change a rear

tire on a steep hill and you have to release the emergency brake in order to turn the wheel. On such occasions, you will find that a short piece of rope fitted with a ring on one end and a snaffle hook on the other will prove useful. As shown in Fig. 3, the rope is snapped in place around the rim of one wheel and the bumper. It will keep the car from coasting even if the brake is released.



Waterproof Glue for Tops

THERE are a number of waterproof cements on the market, but if you cannot secure any in your locality, a satisfactory waterproof glue can be made at home by taking an ordinary small bottle of glue and stirring in a teaspoonful of water to which has been added five or ten grains of potassium bichromate. The glue must be hot. After this mixture has dried and been exposed to the sun for a few hours, it will not dissolve or soften in water. It is fine for painting into small cracks in the top of a closed body and to repair a leak, and it looks much neater than a patch. On open car tops a neat repair can be made by using this waterproof glue to attach a patch to the inside of the fabric.

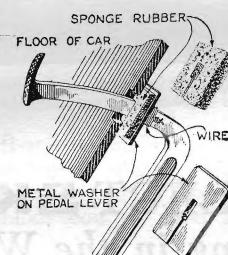


Fig. 2. A plate covered with sponge rubber, fitted on a pedal, keeps the cold air from chilling the feet

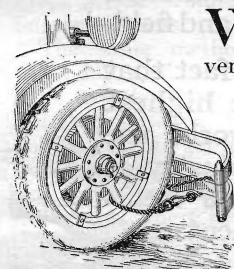


Fig. 3. A simple brake is made with a rope, ring and snaffle hook that fastens wheel and front bumper

Wires Brace Garage Door

IF THE garage doors are sagging so that they no longer close properly, the best remedy is to have them taken down and repaired by a competent carpenter, but a temporary job can be done that will actually pull the doors back in place and prevent any further sag by drilling holes as shown in Fig. 4. Then a piece of stout galvanized wire is looped through the holes as indicated, and a bolt or spike used to twist the wire to take up the slack. Considerable tension can be obtained in this way—enough to pull the door into shape.

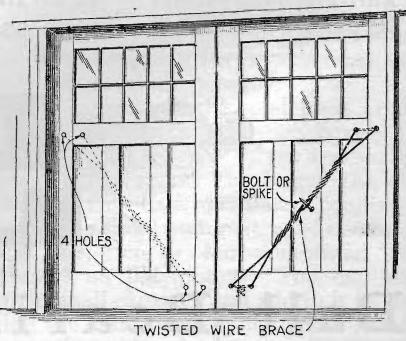


Fig. 4. Sagging garage doors are temporarily made right by drilling holes, running wire through them and then twisting it with an iron spike or heavy bar until the wire is as taut as possible

Kinks That Will Help Your Car

Auto Convertible into Bedroom—Garage Doors That Close Themselves—Handy Quick Acting Jack—Other Good Ideas

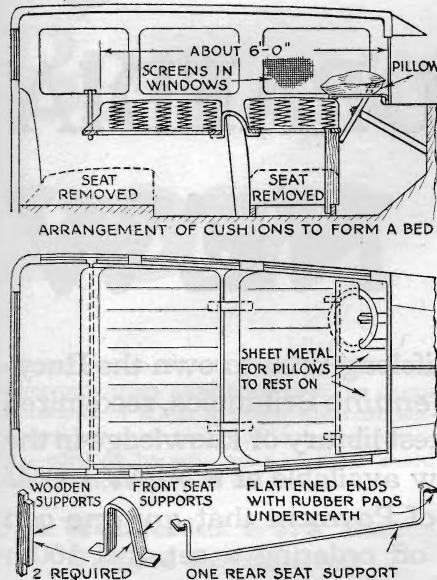


Fig. 1. Seat cushions can be made to serve as a mattress in camping. Screen two windows

A Bed in a Motor Car

HERE is an ingenious way to utilize the regular front and rear seat cushions of your closed car as a bed while auto camping. As you will note from Fig. 1, you will need to construct one long bracket to support the rear end of the rear seat cushion. The ends of this bracket rest on the rear window sills to fit a rubber pad on each end of the bracket. The two brackets that fit over the back of the front seat are heavy strap iron. If the front seats are divided you will need four brackets, two for each front seat. Wooden supports hold the front edge of the front seat cushion and a sheet metal support for the pillows completes the bed. A long roll-shaped cushion can be fitted into the space between the front and rear cushions if desired.

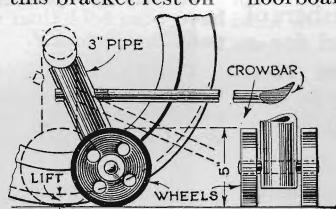


Fig. 2. Simple jack made of an old crowbar, a bolt and pulley wheels

A Quick-Acting Jack

WHILE the regular style of jack that you usually carry in the tool kit is, of course, adequate for emergency tire changes on the road, you will find that a simple quick-acting jack such as is shown in Fig. 2 will save a lot of back-breaking work in the home garage. The materials you need to construct this jack are an old crowbar, a piece of heavy three-inch pipe, a long half-inch bolt and two five-inch iron wheels. Ordinary crown pulleys will

do nicely. The upper end of the pipe is rounded to fit the axle. Be sure to drill the hole for the crowbar at the proper angle. Then when the crowbar strikes the ground the wheels will have rolled just past center under the axle.

Back Through Garage Doors!

OPENING the garage doors, driving out and then having to get out of the car to shut the doors after you is a nuisance when you are in a hurry. By constructing garage doors after the fashion shown in Fig. 3 you will be able to back right through the doors, and they will close after you, eliminating the necessity for getting out to close them by hand. As you will note from the drawing, a rope or cable is arranged over pulleys so that swinging the lower half of the door down automatically raises the upper half. You will have to work out the locations of the pulleys to suit your own garage. Be sure that the lower half of the door is built strong enough to stand the weight of the car and use counterweights to assist the closing with rubber bumpers to take up the jar.

Tool Boxes in the Floor

IN LONG trips it is difficult to find room for extra tools. Fig. 4 shows how to solve the problem. If you will take up the floorboards in front of the rear seat you will find that there is plenty of room for at least one deep tool box and one shallow one. The latter is necessary to clear the exhaust pipe. Make the boxes of galvanized iron riveted together at the seams. Remember that the body with the tool boxes drops down much nearer the axle when the car goes over a bump, and allow plenty of clearance. The illustration also shows a neat arrangement

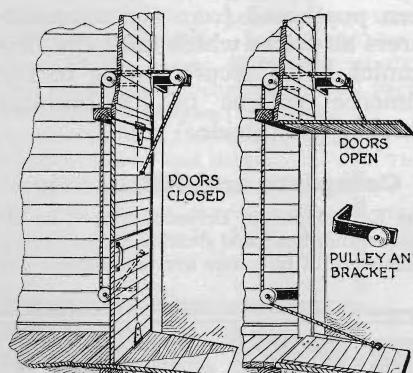


Fig. 3. Construction of garage doors that will close themselves after you have backed out

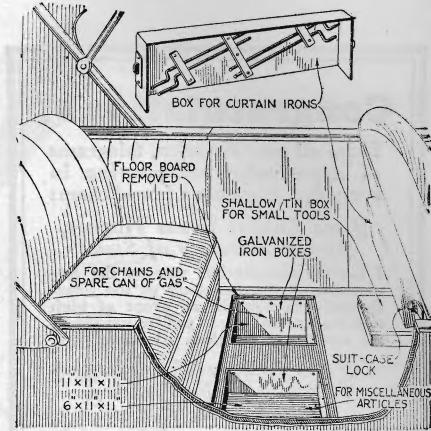


Fig. 4. Extra compartments for tools and odds and ends can be fitted under rear floorboards

for packing the curtain irons. The shallow tin box for small tools to slip under the driver's seat, also shown in the drawing, is particularly good for closed cars of the coach type, where the front seats tip forward.

Swinging Stop Light

MOST cars sold today are regularly fitted with stop lights, but here is a way to make yours more effective than the standard. Look over Fig. 5. In place of the regular stop light fit a board, and to the top of it attach an ordinary vacuum type windshield wiper. Replace the wiper with a lightweight tail-light. The rubber hose should be run to a valve on the dash board and the other side of the valve piped to the intake manifold of the motor. The bulb in the swinging stop light should be wired to the regular stop light switch, operated by the foot brake.

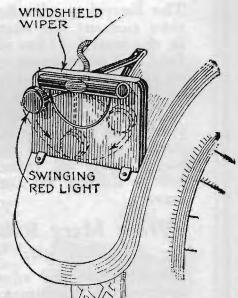


Fig. 5. A swinging stop light commands immediate attention

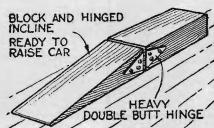
Ten Dollars for an Idea!

P. H. ASHBY, of Strathcona, Alberta, Canada, wins the \$10 prize this month with his garage door suggestion (Fig. 3). POPULAR SCIENCE MONTHLY awards \$10 monthly, in addition to regular space rates, for the best suggestion for motorists. Other contributions published are paid for at usual rates.

Useful Kinks for the Motorist

Double Purpose Light Switch and Other New Ideas

MODERN automobiles are built so close to the ground that it is no longer easy to crawl underneath them to do any necessary repair work. Of course, it is easy enough to jack up either the front or rear wheels to make it easier to work under the car, but there always is the possibility that the jack mechanism will break or that the car will roll off the jack in response to a sudden pull with a wrench or other tool applied to some part of the chassis. Wooden blocks made up as shown in Fig. 1 will eliminate both these possibilities and also save time. It is desirable to hinge the tapering ends so that they can be swung around out of the way after the car has been run up on the blocks. This arrangement will give you more room and make it easier to move around.



Two-Purpose Light Switch

A NOVEL switch arrangement that can be used for two purposes is shown in Fig. 2. The switch is mounted on a small block placed just in front of the gear shift lever. In the drawing the size of the switch has been exaggerated to show the construction more clearly. The switch should be mounted so that the gear lever will push in the block to which the switch spring is attached only when the gear shift lever is moved to the left and forward, in which position the gears are in reverse on all new cars. The switch can be wired in parallel to the regular stop light switch so that the stop light will be lighted at all times when the car is in reverse. Or if you have to back your automobile out of a long driveway in the night time, you can fit a small spot light on the back of your car and wire it by way of this switch to the storage battery or the ammeter. Then when you push the lever into reverse in

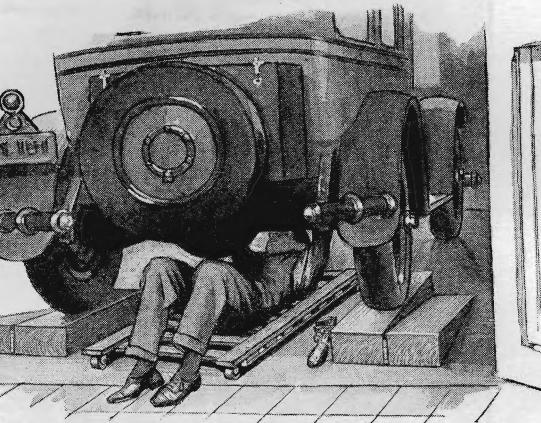


Fig. 1. By using wooden blocks you can get more space in which to work under your car and eliminate the danger of the car rolling off the jack. Cutting the blocks at the incline and hinging them facilitates moving around

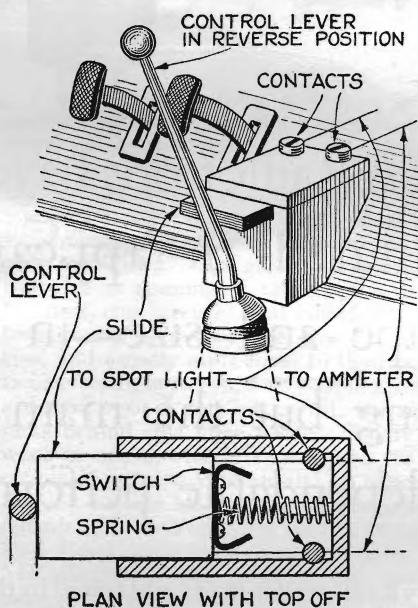


Fig. 2. A switch like this can be wired to turn on a spot light fastened to the back of the car so that you can see your way when backing

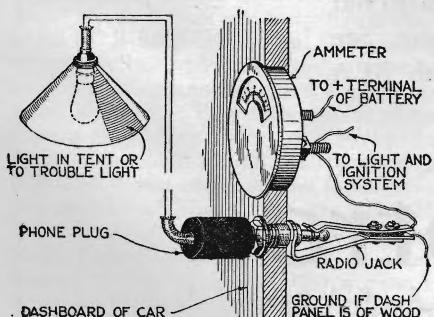


Fig. 3. On modern cars with indirectly lighted instrument panels, a radio jack and plug will prove useful for connecting up a trouble or camp light

Ten Dollars for an Idea!

RICHARD GRAUER, of Austin, Minn., is the winner of the \$10 prize this month for his suggestion of the novel two-purpose light switch that is shown in Fig. 2. Each month POPULAR SCIENCE MONTHLY awards \$10, in addition to the regular space rates, for the best suggestion for motorists sent in by any reader. Other contributions that are published on this page are paid for at the usual rates.

order to back at night, the light will show you the way.

Jack for Extra Light

THE usual method of connecting up a trouble light is to plug it into the dash-light socket in place of the dash-light bulb, but with so many of the new cars fitted with panels that are indirectly lighted, this method is no longer practical. Of course, you can fit a metal spring clip to each of the two wires from the trouble light, but it is a nuisance to locate the proper points in the wiring each time you want to use the light. A simple solution of this problem is to fit to the panel an ordinary open-circuit jack such as is used for the loudspeaker of a radio receiver and then fit a regular loudspeaker plug to the end of the trouble cord. This arrangement, as shown in Fig. 3, is particularly handy if the extra light happens to be a light for your tent when camping.

When the Axle Breaks

WHEN the axle breaks on many types of cars it is impossible to tow them because the broken axle works out of the housing. If the break is close to the differential gear, the axle will support the wheel so that it will run true enough to tow the car if the device pictured in Fig. 4 is used. A wooden bar of two-by-four-inch cross section is placed as shown and wired to the rear end of the running board and to the rear end of the rear spring. A hole large enough to accommodate the end of the axle should be bored in the wooden bar. Of course extra strain is imposed on several parts of the rear axle assembly, so the car should be towed slowly and carefully, especially around corners.

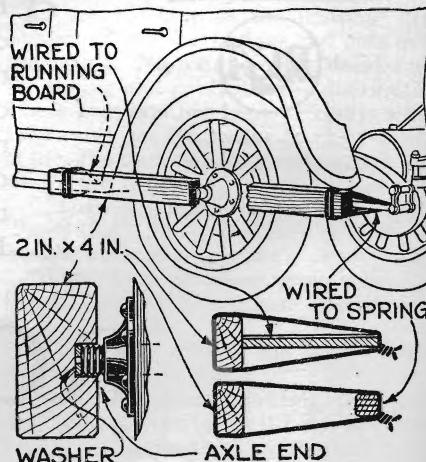
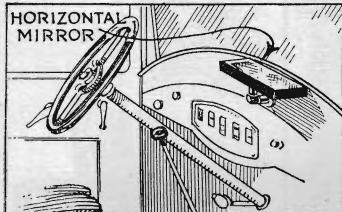


Fig. 4. Provided the axle is not broken too near the wheel, you can tow your car to the repair station by using a wooden bar as shown above

Helpful Hints for Motorists

Mirror Keeps Traffic Lights in View—Tool Compartment That Locks—Handy Spouted Can—Light Tells When Brake Is On



Traffic Light Mirror

THE combination of high-swung traffic lights and low closed car tops has resulted in a difficult problem for the motorist. When you pull up to the indicated white line on the pavement because the red "stop" light is on, you usually find that you can no longer see the light without bending forward and squinting upward. Sometimes, of course, you can watch the traffic light a few blocks farther on, and occasionally you can keep tabs on them by watching the light two or three blocks behind you by means of your rear vision mirror. A simple way to eliminate the need for bending forward and looking upward is shown in Fig. 1. Any standard type of rear vision mirror can be mounted at any convenient point on the dash and so adjusted that it will reflect to your eyes the traffic light you find it necessary to watch.

A Locked Tool Compartment

WHILE many motorists have no scruples about borrowing tools from a near-by car if the tools are not locked up, relatively few auto owners will break open a lock to get at the tools. Therefore, any kind of lock is better than leaving the tool compartment without any protection. The drawing in Fig. 2 shows a simple tool compartment built into the door. The usual fabric, cardboard or veneer covering on the inside of the door is removed and replaced with a

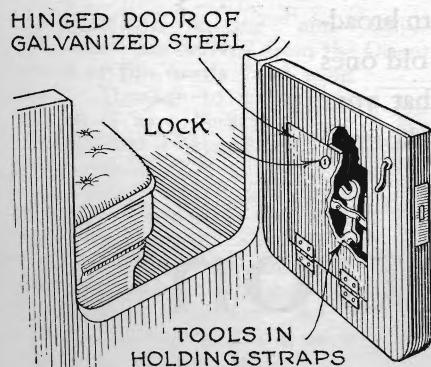


Fig. 2. A tool compartment with straps for the most used tools and a galvanized steel door fitted with a good lock will keep the tools safe

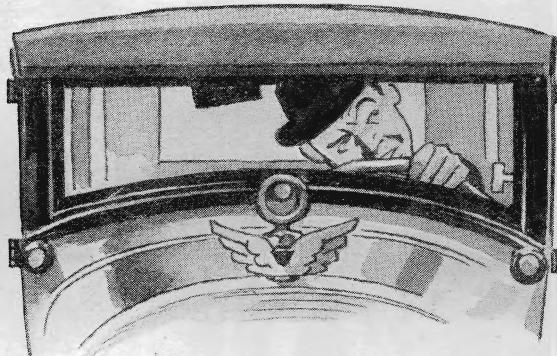


Fig. 1. In order to avoid squinting under the sunshade to determine when the traffic light changes, mount a mirror as illustrated in the drawing at the left

Ten Dollars for an Idea!

JOHN ODILL, of Norway, Mich., wins the \$10 prize this month with his suggestion for a brake position indicator (Fig. 4). POPULAR SCIENCE MONTHLY awards \$10 each month, in addition to regular space rates, for the best suggestion sent in for motorists. Other contributions published are paid for at the usual rates.

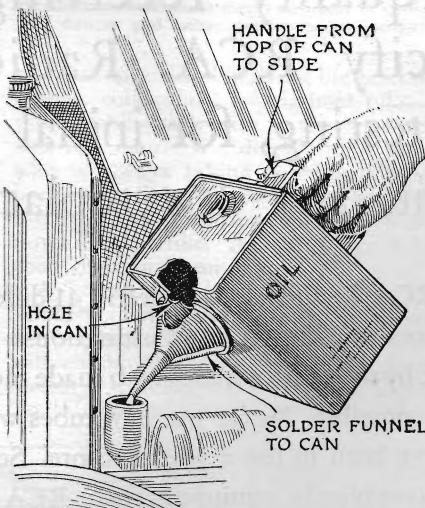


Fig. 3. An old oil or varnish can is easily fitted with a spout made of a funnel. It will prove a timesaver and save spilling when adding oil to crank case

sheet of galvanized sheet steel with a door fitted into it. Loops of leather are arranged to hold the tools that you are most likely to need in a hurry. The hinges of the door should be held in place with rivets, and if carefully fitted and equipped with a good lock it will resist the efforts of any but a determined crook.

Handy Spouted Can

POURING oil or any other liquid from a large can without spilling is extremely difficult, especially when the can is nearly full. Then, too, a funnel that stands around the home garage catches a lot of grit and dust that is carried into the motor crank case each time the funnel is used. Fig. 3 shows how to arrange a large oil can to eliminate these troubles. A hole is cut in the side with a can opener and a small funnel is soldered in place over the hole. The handle on the top of the can is unsoldered and resoldered in place on the side of the can opposite the funnel, making pouring of oil easy.

Light Shows Brake Position

IT IS safe to say that practically every driver of an automobile occasionally attempts to start his car with the emergency brake set. Ordinarily, the driver notices something is wrong at once and so no damage is done, but there have been many cases where propeller or axle shafts have been snapped off or transmission gears seriously damaged. And there are many otherwise excellent drivers who never seem to get over the habit of forgetting to release the emergency brake. Fig. 4 shows a novel way to prevent this trouble. A special lamp automatically indicates when the emergency brake is on, but it lights only if the ignition also is turned on, and therefore does not stay lit when you leave the car with the emergency brake set.

An excellent lamp for this purpose would be one of the red or green jeweled indicating lights sold for use on the panels of radio receivers. Another simple arrangement would be an ordinary flush type socket with a two-candlepower bulb, colored red or green. The wiring diagram for this indicator is shown below.

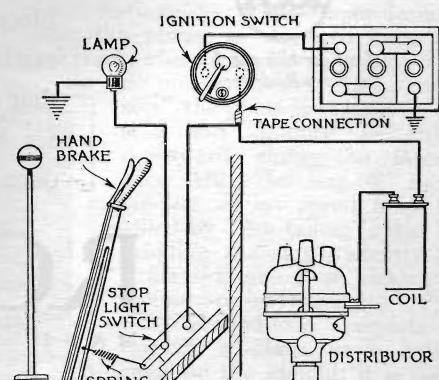


Fig. 4. An indicator light fastened to the dashboard and wired in this way will save you from attempting to start the car with the emergency brake set

Handy Kinks for Car Owners

Strong Start on Weak Battery—Other Useful Hints

ASY starting for the automobile motor depends on the proper mixture of gasoline and air and on a strong, hot spark, assuming of course that the mechanical condition of the motor is good.

By pulling out the choke knob you can be sure that there will be plenty of gasoline in the mixture, and by using the arrangement shown in Fig. 1 you can get a stronger and hotter spark than normal, even though the storage battery is not fully charged.

A fixed resistance coil is connected in the circuit in series with the spark coil to limit the amount of current that will flow in the coil and prevent it from burning out if you accidentally leave the ignition switch turned on when the motor is not running. The idea is to connect a stop light switch as shown in Fig. 1 so that when the plunger of the switch is pulled out the resistance coil will be short-circuited. The plunger of the stop light switch is connected by means of a piece

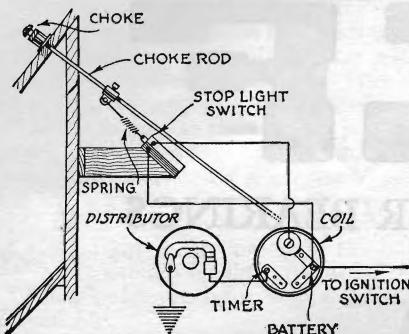


Fig. 1. Easy starting is insured by connecting a stop light switch with the choke button so that a resistance coil on the spark coil is short-circuited when the choke is out, giving a strong, hot spark

of wire and a spring to the choke rod, so that when you pull out the choke the resistance coil will be short-circuited and an abnormally large amount of current will flow through the spark coil, producing a fine spark even with the starting motor drawing a large amount of current from the battery. Pushing in the choke rod again after the motor starts restores the circuit to normal running condition.

Novel Ash Disposal

IF YOU have ever tried to knock the ashes from your cigarette or cigar by putting your hand out of the window and have had the ashes blown back into your face and all over the inside of the car, you will appreciate the ash disposal system detailed in Fig. 2. It consists, essentially, of a piece of one-inch flexible tubing such as is used in electric wiring. A flared nozzle

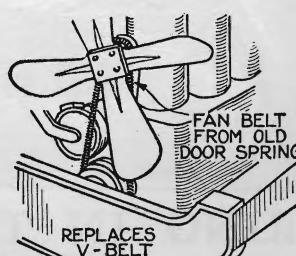


Fig. 4. An old screen door spring connected at the ends will operate the fan until you can replace a worn-out belt

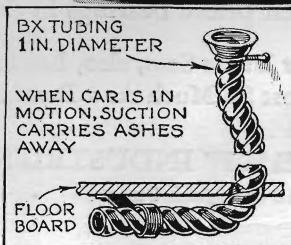
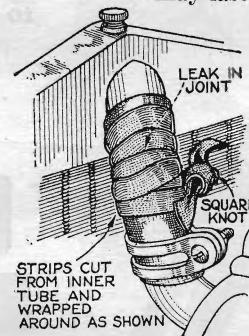


Fig. 2. A flexible tube placed as shown above will solve the driver's cigarette and cigar ash problem

Fig. 3. Right: When the hose clamp breaks or the bolt strips, a piece of old inner tube makes a water-tight emergency repair



so the ashes will not get on the storage battery. A couple of coats of any dark brushing lacquer makes the tubing inconspicuous.

Emergency Hose Repair

IF THE water-hose clamp-screw becomes stripped or the clamp cannot be tightened any more, you can make an emergency repair with a long strip of rubber cut from an old inner tube. Slide the clamp down out of the way and wind the strip of inner tube tight around the end of the hose and down onto the pipe. If the rubber is wound carefully and tight and the ends knotted as shown in Fig. 3, you will get a water-tight connection that may last for a long time.

Spring as Fan Belt

WHILE the only proper thing to do with a worn-out fan belt is to replace it with a new one, you can make a screen door spring serve in an emergency, as shown in Fig. 4. Two springs may be hooked together to take the place of a very long spring. Of course it is desirable to replace the spring belt with a regular leather belt at the earliest opportunity, as the spring belt will wear a groove in the pulley if used for any length of time and the groove will cause excessive wear on the new leather or composition rubber belt when you eventually fit it.

Round the Spring Edges

SOMETIMES springs will wear in such a way that the car will ride with a peculiar bumpy motion. This occurs when the shorter leaves are formed so that the edge gradually wears a section

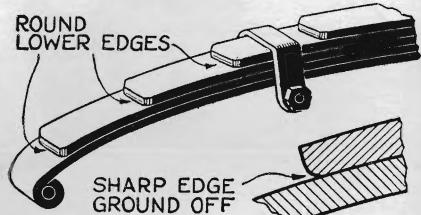


Fig. 5. Rounding the edge at the lower end of each leaf of the spring will prevent wearing away a depression in the leaf below and preserve smooth spring action even when riding over large bumps

is fastened to the top. Part of a small tin funnel will do nicely after the small end has been cut off. The lower end of the flexible tubing is passed through a hole in the floor boards and clamped by means of a sheet iron bracket with the open end pointing toward the rear of the car. The motion of the car will create a draft of air downward through the pipe to carry the ashes away.

It is desirable to locate the lower end of the pipe

of the leaf below it. When the wheel strikes a bump slightly larger than normal the edge of the spring is forced to ride up over the corner of the depression worn in the lower spring. The cure for this is to round the sharp edge at the lower end of each leaf as shown in Fig. 5.

Useful Ideas for Your Car

Lifting Car Off Springs—Dented Fender Smoothed—New Battery Cover—Guard Saves Bumper—Clever Oil Filter

AN ORDINARY iron C-clamp proves serviceable in many cases in removing dents from automobile fenders. To prevent damage to the finish, a wooden block of suitable size is placed under the mud guard and another on top of it at the point where the dent is located. These blocks should be of smooth, hard wood. The clamp is screwed as tight as possible with the fingers as shown in the illustration of Fig. 1. Then the clamp is gently rocked back and

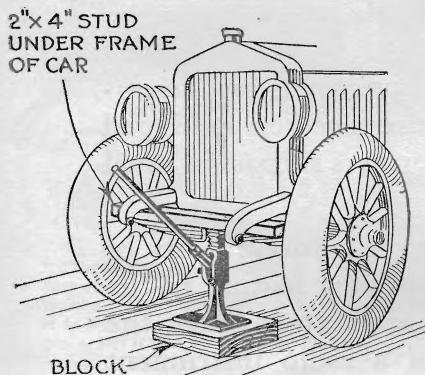


Fig. 2. Here is a simple way to jack up the frame of the car so as to take the weight off both front springs. The splash apron, of course, is removed

forth. The pressure and the motion slightly flattens the dent and the screw of the clamp can again be tightened. The operation is repeated until the dent is completely flattened out.

Taking Weight Off Springs

THE front end of an automobile may be easily raised to permit the removal of the springs. All you need is the regular

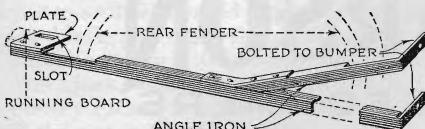


Fig. 3. A rear fender guard like this prevents motorists from hooking your bumpers. It can be removed easily and quickly for changing tires

jack, a wooden two-by-four, and a block of wood, arranged as in Fig. 2.

Fender Guard Avoi ds Hooking

IN FIG. 3 is shown a simple rear fender guard that will keep the other fellow's bumper from catching in yours if he happens to swing in too close. It is made of angle iron with portions cut away at the points indicated to clear the edge of the fender. By removing the rear wing nuts and loosening up the front one the guard can be removed for tire changes.

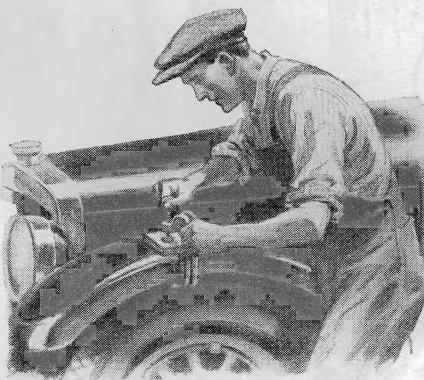


Fig. 1. You can use a C-clamp and two blocks of smooth, hard wood to flatten out mud guard dents

Ten Dollars for an Idea!

E. E. LINDSAY, of Champaign, Ill., wins this month's \$10 prize with his suggestion of an oil filter (Fig. 5). Each month POPULAR SCIENCE MONTHLY awards \$10, in addition to regular space rates, for the best idea sent in for motorists. Other contributions published are paid for at the usual rates.

Ingenious Oil Filter

FIG. 5 shows a homemade oil filtering system that can be applied to any automobile to make it modern and up-to-date.

You need one vacuum tank in good working order. A serviceable one can be obtained at a low price from any auto wrecking yard. In addition, you need the outer shell of another vacuum tank to serve as a filter compartment. Of course, this tank could be soldered up

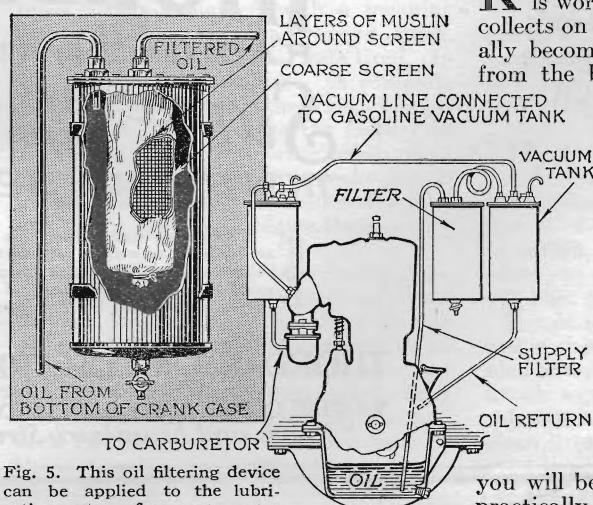


Fig. 5. This oil filtering device can be applied to the lubrication system of any auto motor

from sheet metal in any shape desired. Copper piping is used to connect the tanks as shown in the illustration. If your car is fitted with a vacuum tank to supply gasoline to the carburetor, fit a tee instead of an elbow on the intake manifold pipe. If your car has no vacuum tank, run the air pipe from the vacuum tank which is to pump oil through the filter directly to a coupling fitted into a hole drilled in the intake manifold. As long as the motor is running, oil will automatically be pumped up through the filter and allowed to run back into the crank case. This system will work perfectly on any type of gasoline engine no matter what type of lubricating system is used.

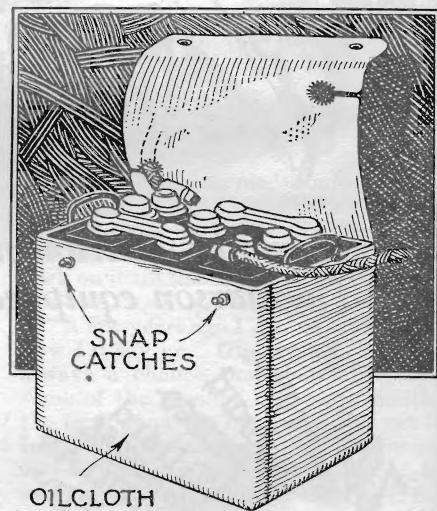


Fig. 4. A cover made of oilcloth will keep the battery clean and stop corrosion and current leakage

Cover Keeps Battery Clean

KEEPING the starter battery clean is worth while because the dirt that collects on the top of the battery eventually becomes soaked with creeping acid from the battery and greatly increases

the corrosion as well as the leakage. A piece of oilcloth as shown in Fig. 4 will serve to keep dirt and water splashed up from the road from collecting on the top of the battery. It can be made to fit snugly by cutting openings for the cables and fitting snaps along one edge to hold it in place. If the top of the battery is wiped off with a rag moistened with household ammonia at intervals, and the cover is kept buttoned, you will be able to keep the battery in practically new condition.

Helpful Kinks for Your Car

Opening Garage Doors Without Leaving Car—Simple Tester For Valves—Handy Trouble Light—Single Contact Bulb

WHEN you come back from a drive it is a nuisance to have to get out, unlock and open the garage doors, climb back in the car, and drive in. A novel and ingenious way to arrange self-opening garage doors is shown in Fig. 1, and details of construction are given in Fig. 2. Instead of stopping the car you reach out and pull the end of cord placed conveniently near the driveway and some distance from the garage doors. The doors at once swing open and you continue into the garage.

The secret lies in the peculiar leverage that translates the downward pull of two weights into effective opening pulls on the doors. Note that the point of attachment for the end of the cord is on the end of wooden frame so that as the door swings outward the point of attachment moves to let the weight go downward. Fig. 2 shows the release latch which should, of course, be fitted to the door which has a bead to keep the other door closed.

Handy Trouble Light

THE best place for a trouble light is where it will shed its rays on the work as nearly as possible in

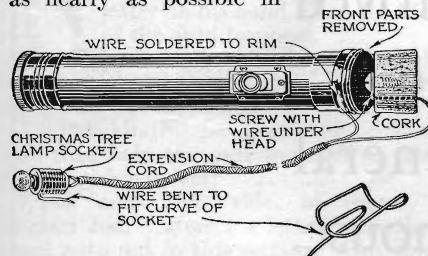


Fig. 3. Design for a trouble light for attachment to your hat brim so that it shines always directly on work anywhere about your car.

line with the line of sight. When working around a car you constantly shift your point of view, so no matter where you fasten the light there are often shadows just where you want to see what you are doing. Fig. 3 shows how to fix up a trouble light that will always be where you want it. A cork takes the place of the regular reflector and lens, with a screw in the center of the cork to make contact with the center electrode of the battery. A Christmas tree lamp socket or a standard miniature lamp socket is connected to a length of electric light drop cord with one of the wires connected to

the metal shell. Then add solder to the remaining contact in the form of a gob that reaches over toward, without quite touching, the other contact. The changes are illustrated in Fig. 4, at bottom of the page.

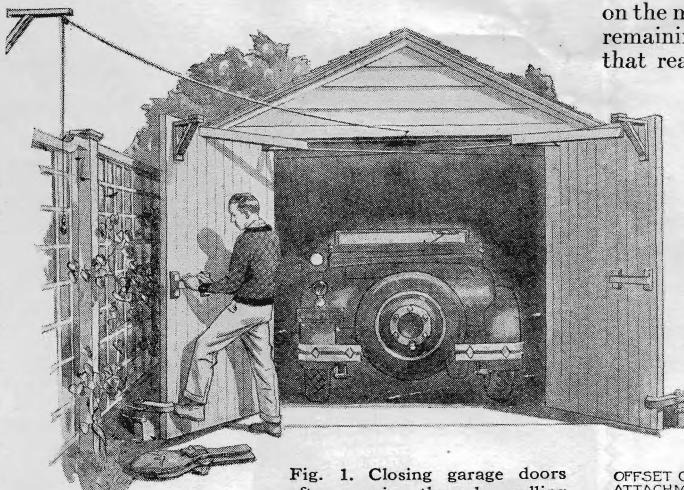


Fig. 1. Closing garage doors after opening them by pulling cord to operate the weights and driving in without leaving car.

Ten Dollars for an Idea!

WALTER E. BAILEY, of Maywood, California, wins this month's \$10 prize with his suggestion for garage doors opened without leaving the car (Figs. 1 and 2). Each month Popular Science Monthly awards \$10, in addition to regular space rates, for the best idea sent in for motorists. Other contributions published are paid for at usual rates.

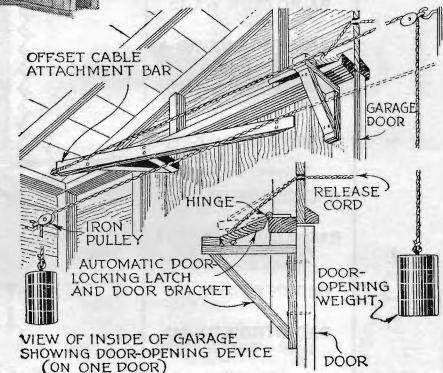


Fig. 2. Arrangement of weights and pulleys to open garage doors and the release latch which is used to put the handy device in operation.

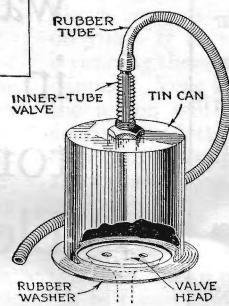


Fig. 5. Place this device over the valve and if you can blow into it continuously the valve tested is not gas-tight.

Improvised Bulb of Single Contact

SOMETIMES it is impossible to obtain in an emergency a single-contact auto bulb of the candlepower you desire. However, if you can obtain a double-contact bulb of the required candlepower, a minute's work with a soldering iron will convert it for single contact use. Remove the gob of solder on one of the contacts and flow it down over the insulation so that the solder makes a firm contact

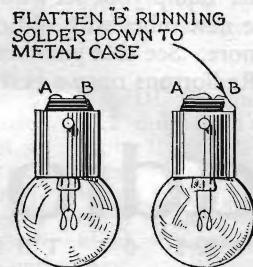


Fig. 4. How to alter the soldering on a double contact bulb to make it single.

is, however, difficult to tell when the valve is actually gas-tight. Fig. 5 shows a simple way to make a valve tester that will tell at once if the valve is gas-tight.

Through the bottom of a tin can drill a hole large enough to let the stem of a tire valve pass through. Use washers cut from an old inner tube to make the valve stem an air-tight fit and also cut a large rubber washer that can be placed under the

edge of the can as shown in the illustration. A short section of rubber tubing slipped over the end of the valve stem completes the equipment. To test a valve, wipe both the face and seat so that they will be free from oil or grinding paste, press the can tightly over the valve with the rubber washer under it, and blow in the tube. If you can continue blowing it proves that air is leaking past the valve and further grinding is needed. Make sure the tester is air-tight by testing it on a flat metal surface. The piston top will serve as a test surface.

You May Find the One Idea You Need Here

Five Quick Motor Car Tricks

Does the Rain Drown Your Motor? Is the Window Cracked? Do Insects Clog Your Radiator? Here's How Others Fixed It

GENERALLY when your motor refuses to start after a heavy rain it is because water has leaked through the hinge joining the two sections of the hood. Fig. 1 shows how a gutter of sheet iron or, preferably, brass can be constructed to carry the water harmlessly away.

Fixing Broken Window

BRKEN or cracked glass windows on an automobile are dangerous as well as unsightly. If the glass has broken in a clean crack, without shattering at any point, it can be repaired so that the crack will hardly be visible, as shown in Fig. 2.

Obtain a good grade of transparent glass or celluloid cement and a sheet of celluloid. Remove the glass and cement it at the cracks, laying the glass on a perfectly smooth surface if possible. Next, with a soft brush, paint the surface of the glass with the cement. Lay on the sheet of celluloid smoothly to avoid air bubbles. Place a smooth board on the celluloid with weights on top of it until the cement has dried.

A Radiator Screen

TO END the nuisance of insects in your radiator when the pests swarm in summer,

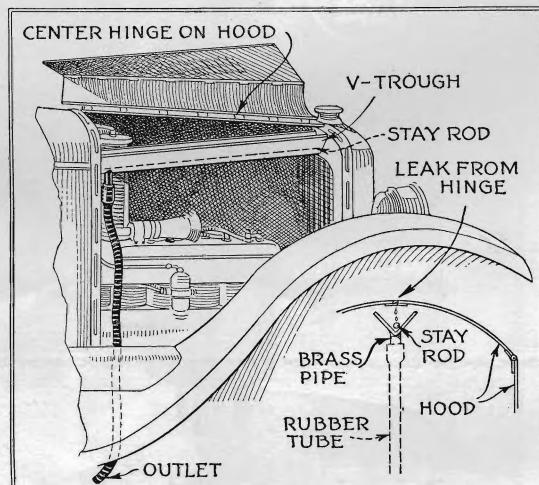


Fig. 1. This easily constructed rain gutter catches drops of water that leak through the hinge at the top of the hood, and carries them to the ground through a pipe.

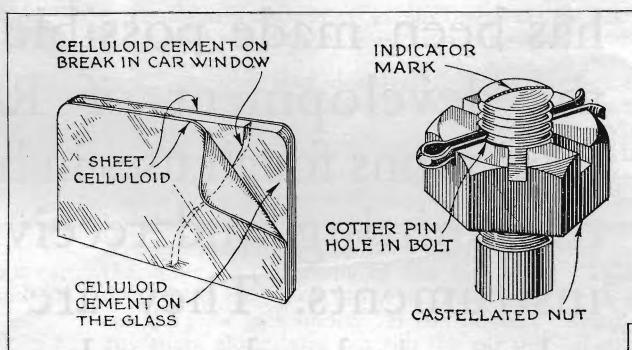


Fig. 2 (at left) shows a neat way of repairing a cracked window with sheet celluloid. Fig 3 (at right) is a time-saving idea for locating a cotter-pin hole by a mark on the bolt.

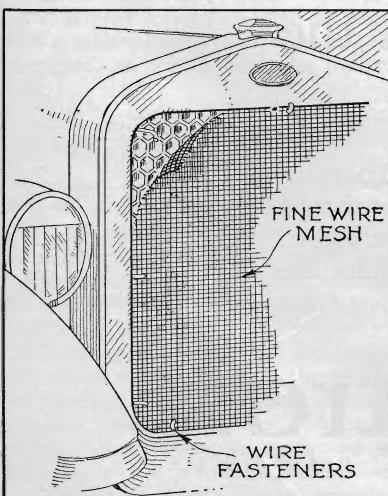


Fig. 4. A piece of close-mesh window screening, fastened to the radiator with wires, keeps insects out of the openings.

keep them out with close-mesh window screening as shown in Fig. 4. After cutting to size, the screen is held in place at several points by wires threaded through the holes in the radiator.

A Quick Way to Find Cotter-Pin Holes

WHEN the bolt and nut are greasy and the light is not particularly good, it is extremely difficult to find a cotter-pin hole.

A time-saving and ingenious idea is to file an indicator mark across the end of the bolt exactly in line with the cotter-pin hole, as shown in Fig. 3. Then you can line up the slots in the castellated nut with this mark and know that the cotter-pin hole will be exactly in line.

How to Get Rid of Annoying Fumes

ITO CARRY off fumes from the crank case and prevent their entering the body of the machine, you can fit such a device as shown in Fig. 5. A half-inch pipe is brazed or soldered into the side of the oil filler pipe and the end of it brought down below the motor. The holes in the cover are plugged.

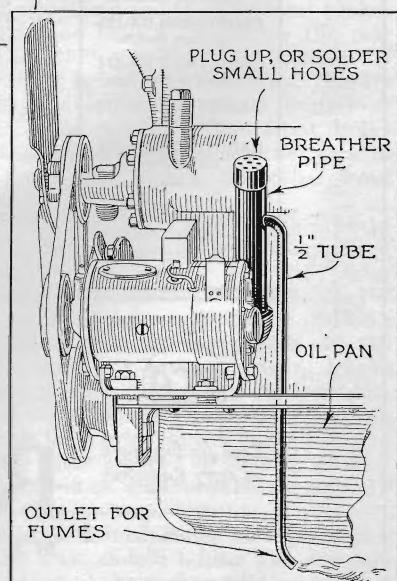


Fig. 5. A half-inch pipe, fastened into the side of the oil filler pipe and brought downward, carries off crank case fumes.

Ten Dollars for an Idea!

THIS month's prize for the most valuable idea for motorists is awarded to Clarence Clevenger, of Santa Clara, Calif. His contribution, a time-saving kink for locating cotter-pin holes, is shown in Fig. 3 and described elsewhere on this page.

Each month Popular Science awards \$10, in addition to regular space rates, for the idea most useful to car owners. Other contributions published are paid for at our usual rates. What particular piece of originality has added to your motor car enjoyment? Write it down and send it to the Technical Editor, POPULAR SCIENCE MONTHLY, 250 Fourth Avenue, New York City.

Little Helps for the Motor Enthusiast

Ideas Others Find Valuable

Tank Measures Gasoline by the Mile—Radiator Thawed by Steam—Emergency Grease Gun—A Runway Over a Curbstone

THE simple auxiliary gasoline tank shown in Fig. 1 will prove very useful to the experimentally inclined motorist. With one of these tanks on your car you can determine gasoline consumption in miles per gallon with the greatest ease. You can quickly determine the most economical speed at which to run your car either on the hills or on the level. It will enable you accurately to check the adjustment of the carburetor and it will make it possible to test the efficiency, in the motor of your own car, of the various grades of gasoline now offered to the public.

Fig. 1 shows the location and piping of the tank. If you make the tank exactly $2 \frac{23}{32}$ inches inside diameter, one inch on the float scale will equal exactly $1/10$ of a quart. The float should be a loose fit and the scale rod attached to it can be a piece of quarter-inch dowel rod. The

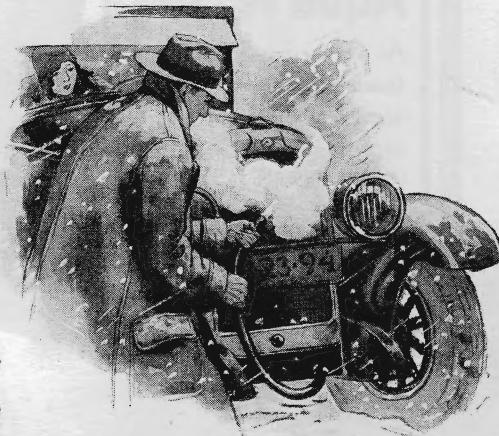


Fig. 2. With a length of hose attached to the lower outlet of your overflow pipe, you can convey steam through the fins of a frozen radiator and speedily thaw it out.

Steam Thaws Radiator

IF YOUR radiator freezes while you are driving, a simple way to thaw it, as shown in Fig. 2, is to attach a short length of rubber hose to the overflow pipe from which the steam is flowing and squirt the steam through the fins of the radiator. Start at the top and work downward. Keep the motor idling slowly

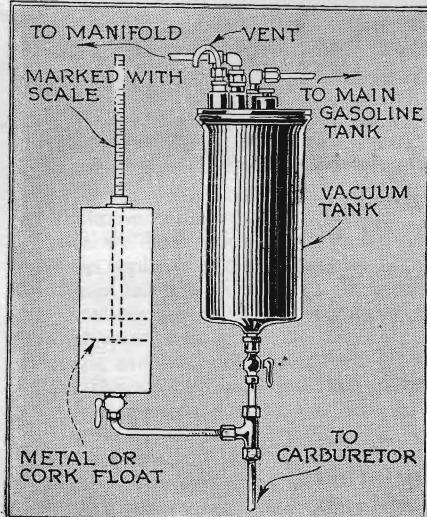


Fig. 1. An auxiliary gasoline tank with a gage that enables you to determine gas consumption and to check carburetor adjustment.

tank should be located just low enough so that the vacuum tank will almost fill it with gasoline.

To test for gas consumption, stop at the beginning of a level stretch, turn pet-cocks so that gas will flow from the test tank, note the scale reading, drive over the test stretch, and again read the scale. Two inches on scale indicates twenty miles to the gallon. Economical carburetor setting is obtained by running over the test course after each change, and so on. The vacuum tank will automatically refill the test tank when both cocks are left open.

Ten Dollars for an Idea!

FRED J. SEVERS, of St. Louis, wins this month's \$10 prize with his suggestion for a gasoline gage (Fig. 1). POPULAR SCIENCE MONTHLY awards \$10 each month, in addition to regular space rates, to the reader sending in the most valuable suggestion for motorists. Other published contributions are paid for at regular rates.

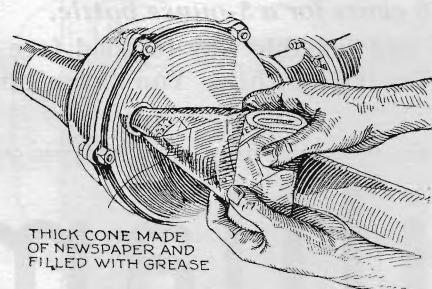


Fig. 3. To fill the differential housing conveniently put the grease in a cone made of newspaper and squeeze it out like tooth paste.

and when the flow of steam stops you will know that all the ice which has clogged the lower portion of the radiator has melted.

Emergency Grease Gun

ONE of the messiest jobs about an automobile is filling the differential housing with grease if you have no grease gun. To avoid this difficulty, make up a cone from several thicknesses of newspaper, fill it with grease, and insert the end of the cone in the filler hole in the rear end housing. Now start rolling the large end of the cone as shown in Fig. 3, and if the cone has been carefully made, you will get all the grease in the hole without soiling your hands. If the grease is very stiff because of cold, it will be well to warm it a trifle before attempting to do the job, so that it will flow into the hole easily.

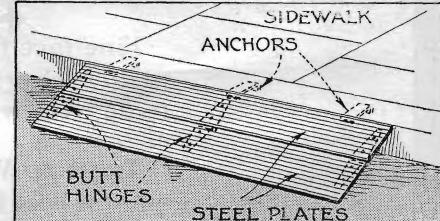


Fig. 4. Steel plates fastened together make a folding runway to take your car over the curb that stands between garage and street.

Fig. 5. Sectional diagram showing runway open and closed and details of its construction.



Novel Folding Runway

IN CASES where it is desired to have a curb on the sidewalk opposite the driveway to your garage, some provision must be made to eliminate the constant pounding your tires will get if they are forced to climb the curb every time you drive the car in. A simple solution of this problem is shown in Figs. 4 and 5. Two steel plates of equal width and as long as the driveway is wide are fastened together with extra heavy butt hinges. Three hinges will do for a light car but for a heavy model use five or six. The upper hinges, or anchors, can be imbedded in the concrete when the curb is formed; if the curb is already made, they can be bolted to it by means of lag screws in expansion shields.

These Kinks for Your Car May Come in Handy

If You're Stuck in the Mud

Or if You Break an Axle, There's a Simple Way Out of the Emergency—Ideas Which, if Heeded, Make Hard Jobs Easy

ONE man can pull a car out of a bad mud hole with a rope, a stake driven into the ground, and a wooden pole such as a fence post or a limb of a tree. Fig. 1 shows how it is done. The forked stick which translates the pull into upward motion is not absolutely necessary, but will help a good deal.

Tie one end of the rope to the car axle and tie the other end to the stake, leaving plenty of slack. Now pass the rope loosely around the pole a couple of turns, insert a stout stick under the part of the rope leading to the car, and pass one end of the stick back of the pole. The stick forms a lever that will multiply your pulling force many times. The smaller the pole the greater the leverage.

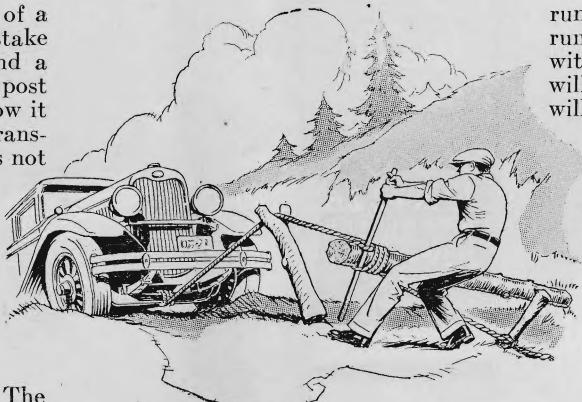


Fig. 1. How an emergency lever can be improvised to enable one man to pull a car out of the mud.

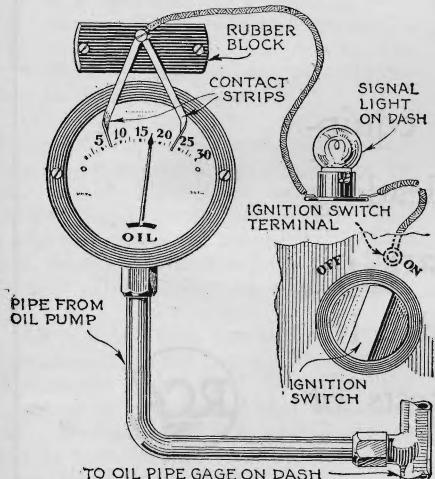


Fig. 2. A warning signal light, wired as shown in this diagram, may save damage to your motor.

Oil Failure Warning Light

WHILE the oil gage on the dash indicates plugged oil pipes by registering excessive pressure, or oil-pump failure by a low pressure reading, you may not happen to look at the gage. Figure 2 shows how to install an electric indicator lamp that will immediately call your attention to any oil failure in case you do not notice the warning of the oil gage.

Procure an extra oil gage and mount it on the back of the dash. Remove the glass. Mount a fiber or rubber block just above the gage and on it fit a couple of light brass fingers arranged to make contact with the gage pointer. The proper settings will, of course, depend on the characteristics of your particular car.

Wire a dash indicator lamp as shown. When the ignition is turned on the bulb will light until the starting of the motor

Ten Dollars for an Idea!

THIS month's \$10 prize goes to J. L. Longino, of Pine Bluff, Ark., for his suggestion of the handy jack base shown in Fig. 3. Each month POPULAR SCIENCE MONTHLY awards a prize of \$10, in addition to regular space rates, for the most useful ideas for motorists. Other contributions are paid for at usual rates. Address the Technical Editor, POPULAR SCIENCE MONTHLY, 250 Fourth Avenue, New York.

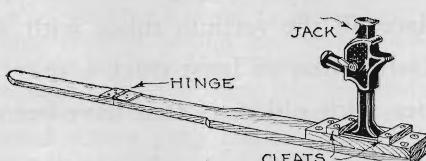
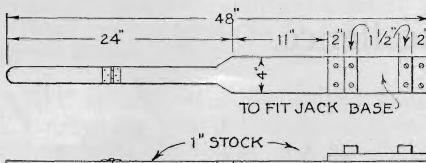


Fig. 3. It's simple to build this folding jack base which simplifies the otherwise awkward job of slipping the jack under the car's rear axle.

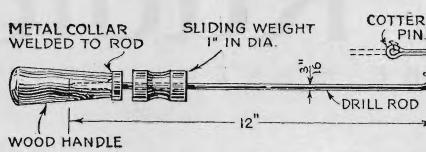


Fig. 4. With the hook inserted in the cotter pin eye, forcing the weight back pulls out the pin.

runs the oil pressure up to the regular running point. If anything goes wrong with the oiling system, the gage pointer will touch one of the fingers and the light will flash a warning.

A Handy Jack Base

YOU can simplify the problem of slipping the jack under the rear axle by making the folding base for the jack, shown in Fig. 3. Cleats hold the jack in place.

The length of the base can be made to suit the car and the hinges can be located to make the base fold into the tool box.

Cotter Pin Extractor

THE design for a simple, homemade cotter pin extractor that will pull the tightest pin with ease is shown in Fig. 4. A metal collar is welded near one end of a piece of drill rod. Then a sliding iron weight is fitted to the rod and the other

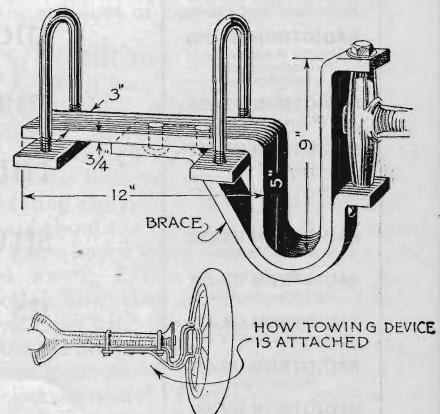


Fig. 5. An emergency towing axle made from two U-bolts, some strap iron, and a front axle.

end of the rod is pointed and bent into a hook. To use, hook into the eye of the cotter pin and move the sliding weight forcibly against the handle. A few hard blows are generally sufficient to remove the most stubborn cotter pin.

A Towing Axe from Scrap

TWO U-bolts, some pieces of strap iron, and a front axle can be fitted together to form the emergency towing axle shown in Fig. 5. If the car axle has broken off at the wheel, this auxiliary axle can be bolted to the axle housing, making it possible to tow the car to a service station where the broken axle can be replaced.

Handy Kinks for Car Owners

A Convenient Place for the Road Map—How to Stop Tire Rim Creaks—Other Ingenious Ideas You May Find Useful

NTOWADAYS nearly every car is built with the top so low that every time you go over a severe bump, your hat brushes against the ceiling. This results in soiled spots, unless special precautions are taken. The simplest of these is shown in Fig. 1. Pin a piece of cloth, matching the top material as closely as possible, at the point where your hat strikes. When soiled it can be removed and washed.

A Ground for the Timer

ONE of the most baffling ignition troubles is a poor ground on the timer housing, caused by the loosening of the bearing between the breaker cam shaft and the housing. A varying resistance

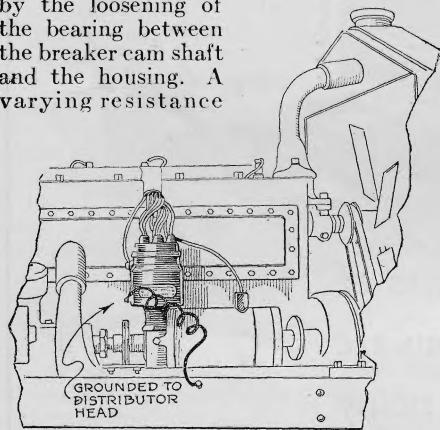


Fig. 2. Effective ground for timer housing.

thus is introduced into the path of the current.

You can eliminate trouble from this source by the method shown in Fig. 2. Fasten one end of a piece of stranded insulated wire under any convenient screw on the metal part of the timer housing. Connect the other end to any screw on the nearest fixed metal part, such as the frame of the car. This wire will provide the necessary path for the current.

To Stop Rim Creaks

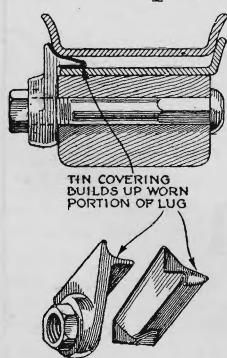


Fig. 5. Sheet tin covering renews worn lugs.

WHEN the lugs wear so much that they no longer can be clamped solidly against the rim, a disagreeable creaking noise is produced. You can remedy the trouble by oversize lugs or by fitting a piece of sheet tin over each lug, as shown in Fig. 5, at the left.



Fig. 1. A ceiling cloth protects the hat.

Novel Place for Licenses

AUTO owners' and drivers' licenses often become misplaced, and then you are out of luck when a traffic cop demands that you produce them. However, if there are pull curtains at the windows of your closed car, you have an

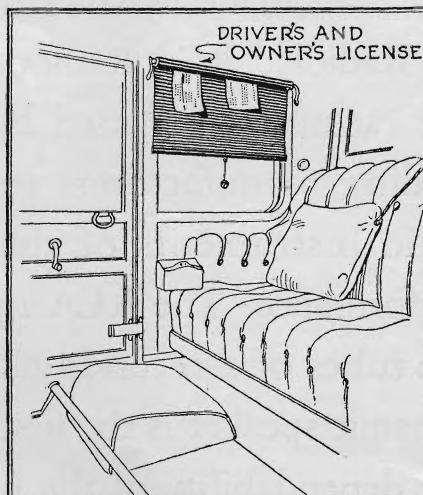


Fig. 3. Rolled in a curtain for safe keeping.

excellent place to keep them. Pull the curtain down, tuck them in the roll, as shown in Fig. 3, then let the curtain roll up again. They will remain where you

Ten Dollars for an Idea!

P. D. Villwock, of Edwardsport, Ind., wins this month's \$10 prize for his suggestion of a curtain road map (Fig. 4). Each month POPULAR SCIENCE MONTHLY awards \$10, in addition to regular space rates, for the best idea sent in for motorists. Other contributions used are paid for at the usual rates.

can always find them. After being in the curtain a while the cards will become set in the rolled form and when the curtain is lowered will curl about the roller instead of dangling.

A Handy Curtain Road Map

ORDINARILY, when you want to consult a road map, you have to unfold a large and hard-to-handle sheet of paper. A convenient way to carry the map is to fit a roller curtain just above your windshield so that it can be pulled down, as shown in Fig. 4. Glue or otherwise fasten the map to this curtain. The

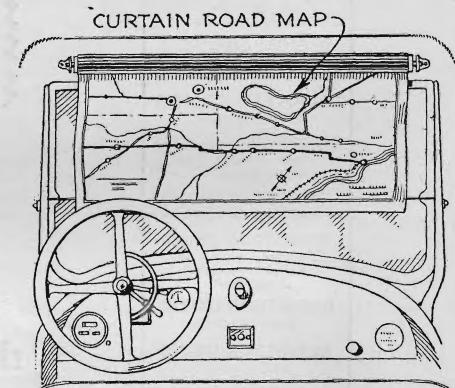


Fig. 4. Glued on a curtain above windshield.

map will cover the windshield and make driving impossible, but you would have to stop the car to study a map anyway.

A Useful Electromagnet

THREE are many times, in auto repair work, when electricity can be made to save a lot of work. For instance, if a steel ball that operates as a check valve in the oil line is in such a position that it will not roll out by gravity, you may have to turn the part upside down to let it roll out.

A homemade electromagnet, shown in Fig. 6, will do the trick. All you need is a small quantity of bell wire and an iron rod small enough to go in the hole. Wind a coil of the wire around one end of the rod, attach the ends to a storage battery, and you will find that the other end of the rod will act in the same way as an electromagnet and pick up any small steel or iron object.

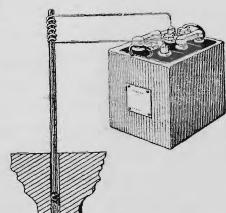


Fig. 6. A simple magnet works from battery.

